SECTION 5

HULL FITTINGS

5.1 REFERENCES

(5A) ADA Accessibility Guidelines for Buildings and Facilities (ADAAG), as amended through September 2002

(5B) International Standards ISO 3434 – Shipbuilding and Marine Structures ~ *Heated Glass Panels for Ships' Rectangular Windows*

(5C) USCG NAVIGATION AND VESSEL INSPECTION CIRCULAR NO. 9-97, *Guide to Structural Fire Protection*

5.2 INTRODUCTION

This Section contains the Contractor Design and Provide general requirements for windows, portlights, ladders, handrails, and other hull fittings applicable to all areas and spaces exclusive

of the machinery spaces. See Section 11 of the Technical Specification for Sea Chest requirements.

For WSF Fleet-wide Standardization purposes, End No. 1 of the Vessel shall always be considered the bow, and this designation shall delineate port and starboard, fore and aft wherever they are addressed in the Technical Specification.

5.3 GENERAL

The Contractor shall provide the necessary classification and protection of all windows and portlights in accordance with USCG and required Authoritative Agency requirements.

All windows and portlights shall be mounted on a flat surface and installed so as to prevent frames and glass from warping or bending. Window glass shall be removable, for replacement purposes, without having to remove the frame, and as set forth below.

Window designs shall provide for an easy of maintenance to allow for replacement of glass panes from inside the Vessel wherever there is not open deck access on the exterior of the installation. Glazing stops shall be attached to the window frames with ¼ inch stainless steel machine screws with spacing of 4 to 6 inch center to center, and provided in a manner that allows for glass removal and replacement from the interior side. ***Open deck access*** *is defined, for this requirement, as a deck area a minimum of 48 inches in front of the window and out from the bulkhead the window is in, and a minimum of 24 inches wider, at each end, than the width of the window,* ***and*** *the installer can move or remove the old/new window assembly to/from the opening without having to use a ladder*. Glass replacement procedures shall be submitted to the WSF Representative for approval prior to style selection and fabrication.

Aluminum and steel weld joints shall be ground smooth to present a visually pleasing match up of the adjacent material.

Where required by USCG regulation, window glass shall be wire inserted. All window assemblies shall meet the fire protection standards for the bulkhead in which they are mounted as set forth in Reference (5C).

All window frames shall be installed in accordance with the manufacturer's approved installation instructions.

5.4 EXTERIOR WINDOWS AND PORTLIGHTS

Exterior windows and portlights shall be provided in general as outlined in this Section. Windows and portlights shall be of weather tight construction, designed and installed so as to

follow the Vessel's faired lines.

Exterior windows, PACIFIC COAST MARINE INDUSTRIES Inc., Model PCM-1092-FX, or equal, shall have heavy duty, welded frame and glazing stops, radius corners, 6063 aluminum clamp-in type frames and at least double panes with a space of at least ½ inch air gap between each pane, except where otherwise stipulated elsewhere in this Technical Specification or by Authoritative Agency requirements for particular windows.

Mounting of glass in window frames shall be such as to prevent vibration and rattling in any position. The design of windows shall allow the glass to be replaced from the inside of the space without removing frames.

Windows shall be arranged in all public lounges to provide unrestricted viewing. Passenger spaces are to emphasize and afford an excellent view of the landscape. Except for primary vertical side support structure, windows shall extend in a continuous line from one end of the Passenger Deckhouse to the other. Window sizes in the Passenger Deck house sides shall be a minimum of 5'-9" wide × 4'-0" high (viewing surface), with a finished sill height not to exceed thirty-three (33) inches, and finished mullion widths not to exceed twelve (12) inches. Windows in the Passenger Deck house ends shall be a minimum of 5'-0" wide × 4'-0" high (viewing surface). Windows in the Sun Deck Passenger Lounges shall have a finished sill height not to exceed twenty-four (24) inches, with finished mullion widths not to exceed nine (9) inches. Window sizes in the Sun Deck Passenger Lounge sides shall be a minimum of 4'-0" wide × 5'-0" high (viewing surface), and those in the end bulkheads shall be a minimum of 5'-0" wide × 5'-0" high (viewing surface).

All windows mounted fore and aft shall be installed parallel to the baseline. Exterior windows mounted transversely shall be installed to follow the camber of the Vessel. Interior windows mounted transversely shall be installed parallel to the baseline.

Windows shall be provided in exterior joiner doors as required by Section 4 of the Technical Specification.

5.4.1 Passenger Deck Lounges, MES Stations, and Officer & Crew Staterooms and Dayroom

Unless otherwise noted, exterior windows on the Passenger Decks, in the Officer and Crew Staterooms, and Dayroom on the Sun Deck are to be heat treated and have a minimum ¼ inch thick panes. They shall be double paned with a minimum ½ inch air gap, filled with Argon gas and glass tint with a "U" Value of 0.25, or equal. Ultraviolet light attenuation shall be at least 91-percent (91%). Infrared light attenuation shall be at least 99-percent (99%). Visible light transmission shall be at least 60-percent (60%) measured at 550 nanometers.

Window assemblies for the Officer and Crew Staterooms, and Dayrooms shall be of the half vent type, PACIFIC COAST MARINE INDUSTRIES Inc., Model PCM-1042-HV, or equal, to allow for individual natural ventilation when desired. The upper stationary portion of the these windows shall be designed and provided with double glaze same as the fixed windows, with ¼ inch tempered single glaze for the movable portion of the window and tinted to be similar to the double pane glass above. These windows shall be provided with readily removable insect screens.

Passenger Deck window frames and trim, PACIFIC COAST MARINE INDUSTRIES Inc., Model PCM-1092-FX, or equal, shall be as specified in Section 25 of the Technical Specification.

All windows for the MES Stations shall be the same as the Passenger Deck exterior windows, except the interior windows shall not be tinted.

5.4.2 Sun Deck Passenger Lounges

Windows in the Sun Deck Passenger Lounges outboard bulkheads shall have aluminum frames with three (3) inch radiused corners, minimum ¼ inch thick, single panes, heat treated and normal clear. Fastenings shall be Type 316 stainless steel. Fastening, gasketing and sealing design shall be approved by the WSF Representative prior to installation.

Sun Deck Passenger Lounge windows shall be, PACIFIC COAST MARINE INDUSTRIES Inc., Model PCM-1109-FX, or equal.

A maintenance walkway shall be provided outside the forward windows of each lounge as set forth in Section 3 of the Technical Specification.

5.4.3 Pilothouse

Pilothouse window design shall provide a 360 degree view with window mullions, molding and trim developed to a minimum depth and width necessary to provide a maximum field of vision with the least amount of visual restriction.

Design and provide PACIFIC COAST MARINE INDUSTRIES Inc., Model PCM-1092-FX, or PACIFIC COAST MARINE INDUSTIES Inc., Model PCM-1109-FX, or equal, for fixed windows. Windows shall have the same characteristics as the *Passenger Deck Lounges and Officer's & Crew's Staterooms and Dayroom* Subsection above with the exception of the centerline windows in the forward facing bulkhead of each Pilothouse (one (1) in each Pilothouse) which shall be double paned, laminated together with no air gap, normal clear with no tint and shall be heated windows. The one (1) drop sash window, in the left side of the forward facing bulkhead of each Pilothouse, shall have a hand crank and stainless steel

drip pan with drain connection to weather. Drop sash window final placement shall be approved by the WSF Representative. At a minimum, the centerline forward facing Pilothouse windows shall be a sixty (60) inch wide windows.

Provide at least five (5) of the windows in each Pilothouse that shall be capable of being opened as set forth below. Windows that have been identified as open-able shall be engineered so as to facilitate that operation. Operation of each window shall be easily operable be one (1) average sized (5'-6" tall) Crew member.

1. One (1) forward facing bulkhead Pilothouse window shall be provided as a full drop sash window PACIFIC COAST MARINE INDUSTRIES Inc., Drawing PCM-2001-FD-C, or equal, meeting the requirements of Reference (5B). This window location on the left side forward facing bulkhead of the Pilothouse shall be as approved by the WSF Representative after reviewing the Contractors Pilothouse design.

2. Two (2) windows on each side of both Pilothouses (total of eight (8) windows) shall be provided as half vent windows (similar to PACIFIC COAST MARINE INDUSTRIES Inc., Drawing PCM-1042 HV), or equal, meeting the requirements of Reference (5B). The upper stationary portion if the window shall be designed and provided with double glaze same as the fixed windows, with ¼ inch single glaze for the movable portion of the window. These window locations on the sides of the Pilothouse shall be as designated by the WSF Representative after reviewing the Contractors Pilothouse design.

A centerline forward facing Pilothouse window (one in each Pilothouse) shall be provided as a heated window (similar to PACIFIC COAST MARINE INDUSTRIES Inc., Drawing PCM-C-10845 as to type, power requirements, and materials), or equal, meeting the requirements of Reference (5B). Each window shall have an individual on/off switch.

Pilothouse front and side windows shall be spaced so that the distance between clear glass openings does not exceed six (6) inches along front and sides.

Pilothouse windows shall have teak sills and trim. Mullions, moldings and trim shall be developed to a minimum depth and width as necessary for practical construction and provide maximum field of vision with the least amount of visual restriction. Pilothouse front window sills shall be no more than forty-two (42) inches above the finished deck and shall be sloped between 10 degrees and 12 degrees forward at the top and beveled as necessary to maintain uniform mullion widths top to bottom at all sloping bulkhead joints.

The rear bulkhead of each Pilothouse shall have windows covering at least 25-percent (25%) of the length of the enclosed portion of the Pilothouse.

5.4.3.1 Pilothouse Window Solar Shades

Provide SOLAR SOLVE MARINE, SOLASAFE® , or equal, horizontal solar shades with side "bead" chain clutch operation, "gray" shade film, anti-glare, anti-fade, heat-rejecting, retractable transparent roller shades for all side Pilothouse windows.

Provide SOLAR SOLVE MARINE, SOLASAFE® , or equal, horizontal solar shades with side "bead" chain clutch operation, "gold" shade film, anti-glare, anti-fade, heat-rejecting, retractable transparent roller shades for all rear bulkhead Pilothouse windows.

Provide SOLAR SOLVE MARINE, SOLASAFE® , or equal, horizontal solar shades with double pulley bottom rail constant tension spring operation, "gray" shade film, anti-glare, anti-fade, heat-rejecting, retractable transparent roller shades for all sloped Pilothouse windows.

One supplier of SOLASAFE® solar shades is PACIFIC COAST MARINE INDUSTRIES, Inc., Everett, Washington. Contact person: Mr. Neil Hamlin or Mr. Rick Doty (425)-743-9550.

5.4.4 Navigation Bridge Deck Unassigned Room

Provide a window in the inboard bulkhead of the Unassigned Room. The window shall be the same in size and type as the Crew Stateroom windows as set forth in the *Passenger Deck Lounges, and Officer & Crew Staterooms and Dayroom* Subsection in this Section of the Technical Specification. This window shall be provided with a readily removable insect screen.

5.5 PILOTHOUSE WINDOW WIPERS

Design and provide window wipers for all forward facing Pilothouse windows. The wipers shall cover the entire rain swept area of visibility with a wide arc wiper clearing at least 80-percent (80%) of the window area. The wipers shall be WYNN MARINE LTD., Type D, or equal, external motor straight line wiper, with fast speed / intermittent control, and park sensor. The layout of wiper motors and controls shall be considered in the Pilothouse Control Console mock-up process. The wipers shall have an automatic parking feature. The wiper motors shall have sealed motor bearings. ***Quiet wiper operation is essential***. The Contractor shall be responsible for ensuring that noise from operating wipers is minimized.

The unit will be powered by 115 volt, single-phase AC with console mounted controls.

The centerline wiper unit shall be sized for the 60-inch width window spoke to above, with twin straight line arm assembly with parallel blade travel. All other wipers shall have standard, single straight line arm assemblies with parallel blade travel. All wipers are to be fitted with 24 inch blades.

Each window wiper shall be a stand-alone unit with speed control that will ensure constant wiper blade speed at each control setting with the window wet or dry.

Wipers on window that can open shall be designed to allow for opening of that window without damage to the wiper assembly.

5.6 WATER-TIGHT WINDOWS AND FIXED PORTLIGHTS

Unless specified otherwise in the Technical Specification, watertight windows and portlights shall have steel frames. Unless specified otherwise in the Technical Specification, portlights shall have no less than sixteen (≥16) inch diameter clear openings. Portlights shall be fixed light type, except in the LVD Deck Crew Shelter which shall be opening style portlights through the curtain plate and fix light through the inboard bulkhead.

5.6.1 Hold Level

Design and provide at least two (2) widely spaced USCG approved FEHRMANN GmbH Drawing B1-170, or equal, 900mm × 600mm (w×h) A-60 rated fixed windows, tested and approved to (≥) 0.3 bar water-on-water tightness with individual work test certificates for each window, in each bulkhead separating the EOS, Workshop, and Engineer's Dayroom spaces from the Engine Room(s). These four (4) windows shall meet all Authoritative Agencies requirements for installation in watertight subdivision bulkheads. The windows shall be double paned, laminated, 100mm corner radii, clear light, centered sixty-three (63) inches above the finished deck. All A-60 rating and individual work test certificates shall be delivered to the WSF Representative **prior** to installation of each window.

A possible vendor for the abovementioned windows is:

MARINE & OFFSHORE SUPPLIES, Inc.
1920 Rensselaer Dr.
Wesley Chapel, FL 33543

contact: Holger Reins
phone: (813) 973-8592
email: www.marineoffshore.net

Should there not be an approved A-60/watertight fixed window, as spoken to above, at Contract time, and with approval of the WSF Representative; design and provide at least two (2), at a minimum, eighteen (≥18) inch diameter (similar to PACIFIC COAST MARINE INDUSTRIES Inc., Drawing PCM-3001-W), or equal, widely spaced A-60/watertight portlights in each bulkhead separating the EOS, Workshop, and Engineer's Dayroom spaces from the Engine Room(s). These four (4) portlights shall meet all Authoritative Agencies requirements for installation in watertight subdivision bulkheads. These portlights shall be normal clear with steel deadlight covers, brass closings, and centered sixty-three (63) inches above the finished deck.

These portlights shall meet the A-60 rating of that bulkhead as set forth in Reference (5C), and water tight requirements of the USCG.

The intent is that there shall be an EOS door window and one (1) each Engine Room bulkhead windows/portlights “line up” that allows the watch stander at the EOS Control Console to view into Engine Room No. 1 and through the Work Shop into Engine Room No. 2 while standing in front of the EOS Control Console.

5.6.2 Vehicle Deck

Design and provide four (4) portlights in the Deck Crew Shelter on the Vehicle Deck adjacent to the exterior curtain plate. Provide two (2) widely spaced portlights in the exterior Curtain Plate and two (2) in the bulkhead facing the vehicle stowage. The portlights shall be normal clear with deadlight covers, centered sixty-three (63) inches above the finished deck. The two (2) curtain plate portlights shall be of the opening type (similar to PACIFIC COAST MARINE INDUSTRIES Inc., Drawing PCM-3002-W), or equal,. For the two (2) facing the vehicle stowage area (similar to PACIFIC COAST MARINE INDUSTRIES Inc., Drawing PCM-3001-W), or equal, with steel deadlight. The interior pane shall be coated with a one-way film to provide complete privacy from Passenger view while providing maximum outside visibility.

Design and provide two (2) portlights (similar to PACIFIC COAST MARINE INDUSTRIES Inc., Drawing PCM-3001-W), or equal, in the deck Emergency Squad Locker on the Vehicle Deck, End No. 1,starboard in the exterior curtain plate. The portlights shall

be normal clear with deadlight covers, centered sixty-three (63) inches above the finished deck.

All portlights shall meet the fire protection standards for that bulkhead in which they are mounted as set forth in Reference (5C).

5.7 INTERIOR WINDOWS AND FIXED LIGHTS

Bulkhead windows and door fixed lights shall be provided for the Engineer Operating Station (EOS) in accordance with this Section and Sections 4 and 50 of the Technical Specification. The EOS windows and fixed lights shall include appropriate structural fire classification, water-tightness, and acoustic treatments.

Fixed lights shall be provided in interior joiner doors as required by Section 4 of the Technical Specification.

Interior window trim shall be in accordance with Section 25 of the Technical Specification.

5.8 LADDERS AND STAIRWAYS

5.8.1 General

All ladders and stairways shall comply with USCG requirements and maintain a minimum of 7'-0" head room measured vertically from the step toe to the overhead. Vertical ladders shall be in accordance with ASTM F840. Where a vertical ladder would be impractical, ¾ inch square rungs in accordance with ASTM F783 (Table 3) shall be provided, formed to a "stirrup" shape and spaced a maximum of twelve (12) inches apart.

Machinery space ladders are specified in Section 79 of the Technical Specification.

Stairways, platforms and landings shall be located as determined by the Contractor's design and provided with deck coverings as specified in Section 6 of the Technical Specification. Finished step heights shall be of equal heights (including finished deck covering). Interior and exterior inclined and vertical ladders shall be provided as necessary to afford convenient access to all decks and spaces and to satisfy regulations.

Ladders shall be installed in a manner that will accommodate relative movement between decks. Inclined ladders shall be removable with 300 Series stainless steel fasteners.

Transversely-oriented inclined ladders may only be used where no reasonable alternative means can be identified to provide access to spaces intended to be served by inclined ladders.

Use of transversely-oriented inclined ladders shall be subject to approval by the WSF Representative **and** the Authoritative Agencies.

Where galvanized steel is specified, it shall be applied by the hot-dip process after fabrication. Galvanizing disturbed during construction shall be touched up with "GALVICON", or equal.

A ladder way shall be provided up each mast as specified in the *Mast* Subsection in Section 8 of the Technical Specification.

5.8.2 Passenger and Crew Interior Stairways

All interior Passenger stairways serving the Lower and Upper Vehicle Decks and the Passenger and Sun Decks shall be structural, fabricated from minimum ¼ inch thick flanged plate to rise and run requirements of Reference (5A). Treads and risers shall be double continuously welded to vertical bulkheads and supports. Finished stairway widths shall measure no less than forty-eight (48) inches between the inside of the handrails.

For privacy purposes for those wearing dresses or skirts, provide a solid hand rail side for any structural stairways between the Passenger Deck and the Sun Deck, Ends No. 1 and No. 2, and wherever such exposure could occur.

The interior stairways between the Sun Deck and each Pilothouse shall be designed and installed the same as interior Passenger Stairways, except they shall have a minimum finished width of twenty-eight (28) inches between the inside of the handrails.

5.8.3 Inclined Ladders – Interior and Exterior, Lower Vehicle Deck and above

5.8.3.1 Navigation Bridge Deck Ladder

An exterior ladder from the Bridge Deck to the Stack access to the Emergency Diesel Generator remote radiator area shall be provided. The ladder shall land on a platform with railings at the Bridge Deck housetop level just outside the access to the radiator area access.

The ladder shall be fabricated entirely of galvanized steel and have a minimum finished width of twenty-eight (28) inches between the inside of the handrails. The ladder shall have 9 inch × 2½ inch × 13.4# channel side rails and shall have 7.65# checker plate treads flanged and welded to stringers. Where deviations are required, they shall be subject to specific WSF approval. The ladder shall be attached in a manner that will allow relative motion of deck and bulkhead.

The ladder shall be portable, bolted to substantial steel clips at the head and rest in sockets at the foot. Where the inclined ladder is attached to deck coamings, the coaming shall be cut away to eliminate a tripping hazard. The ladder shall be fitted with removable welded construction double handrails, two (2) course, tied into the ladder frame vertically. Top course and stanchions shall be of 1¼ inch IPS, Type 316L stainless steel pipe. Intermediate rails shall be ¾ inch, Type 316L stainless steel pipe. Stainless steel railings shall have their welds ground smooth and a polished finish. All rails shall have a hand clearance of a minimum of 2½ inches and extend forty-two (42) inches above the finished deck to which access is given. Adjacent railing and rails shall be attached thereto with slip-joints.

Solid type safety treads, FIBERGRATE COMPOSITE STRUCTURES Inc. Fiberplate® Fiberglass Stair Tread Covers with photo luminescent nosing area, or equal, shall be provided over the treads as specified in this Section and Section 79 of the Technical Specification. Treads shall be attached using Type 316 stainless steel fasteners with Nyloc type nuts.

5.8.3.2 Crew Stairtower Ladders

Provide a Crew Stairtower as set forth in this Section and Section 1B of the Technical Specification. Interior ladders shall be fabricated entirely of galvanized steel and have a minimum finished width of twenty-four (24) inches between the inside of the handrails. The width of the ladder shall be equal to the walkway path between each level ladder to allow for a smooth, non-transitional ladder/walkway width passage Ladders shall have 9 inch × 2½ inch × 13.4# channel side rails and shall have 7.65# checker plate treads flanged and welded to stringers. Where deviations are required, they shall be subject to specific WSF approval. Ladders shall be attached in a manner that will allow relative motion of decks and bulkheads.

Ladders shall be portable, bolted to substantial steel clips at the head and rest in sockets at the foot. Where inclined ladders are attached to deck coamings, the coaming shall be cut away to eliminate a tripping hazard. Each ladder shall be fitted with removable welded construction double handrails, two (2) course, tied into the ladder frame vertically. Top course and stanchions shall be of 1¼ inch IPS, Type 316L stainless steel pipe. Intermediate rails shall be ¾ inch, Type 316L stainless steel pipe. Stainless steel railings shall have their welds ground smooth and a polished finish. All rails shall have a hand clearance of a minimum of 2½ inches and extend forty-two (42) inches above the finished deck to which access is given. Adjacent railing and rails shall be attached thereto with slip-joints.

All ladders below the Lower Vehicle Deck, inclined ladders over stowage spaces, and ladders over other inclined ladders shall have removable sheet metal dust shields underneath as set forth in Section 79 of the Technical Specification. Safety treads, as

specified in Section 6 of the Technical Specification, shall be provided at the head and foot of each inclined ladder.

Solid type safety treads, FIBERGRATE COMPOSITE STRUCTURES Inc. Fiberplate® Fiberglass Stair Tread Covers with photo luminescent nosing area, or equal, shall be provided over the treads as specified in this Section and Section 79 of the Technical Specification. Treads shall be attached using Type 316 stainless steel fasteners with Nyloc type nuts.

5.8.4 Inclined Ladders – Interior, below Lower Vehicle Deck

Interior ladders between the Lower Vehicle Deck and the ***EOS/Workshop area*** 14'-0" level (See the *OTHER KEY DIMENSIONS* Subsection in Section 1B of the Technical Specification) shall be fabricated entirely of galvanized steel and have a minimum width of twenty-eight (28) inches. Interior ladders between the machinery flats areas shall be fabricated entirely of galvanized steel and have a minimum width of thirty-six (36) inches. Ladders shall have 9 inch × 2½ inch × 13.4# channel side rails and shall have 7.65# checker plate treads flanged and welded to stringers. Where deviations are required, they shall be subject to specific WSF approval. Ladders shall be attached in a manner that will allow relative motion of decks and bulkheads. Where inclined ladders are attached to deck coamings, the coaming shall be cut away to eliminate a tripping hazard.

Ladders shall be portable, bolted to substantial steel clips at the head and rest in sockets at the foot. Where inclined ladders are attached to deck coamings, the coaming shall be cut away to eliminate a tripping hazard. Each ladder shall be fitted with removable welded construction double handrails, two (2) course, tied into the ladder frame vertically. Top course and stanchions shall be of 1¼ inch IPS, Type 316L stainless steel pipe. Intermediate rails shall be ¾ inch, Type 316L stainless steel pipe. Stainless steel railings shall have their welds ground smooth and a polished finish. All rails shall have a hand clearance of a minimum of 2½ inches and extend forty-two (42) inches above the finished deck to which access is given. Adjacent railing and rails shall be attached thereto with slip-joints.

All ladders below the Lower Vehicle Deck, inclined ladders over stowage spaces, and ladders over other inclined ladders shall have removable sheet metal dust shields underneath as set forth in Section 79 of the Technical Specification. Safety treads, as specified in Section 6 of the Technical Specification, shall be provided at the head and foot of each inclined ladder.

Solid type safety treads, FIBERGRATE COMPOSITE STRUCTURES Inc. Fiberplate® Fiberglass Stair Tread Covers with photo luminescent nosing area, or equal, shall be provided over the treads as specified in this Section and Section 79 of the Technical

Specification. Treads shall be attached using Type 316 stainless steel fasteners with Nyloc type nuts.

Safety treads are to be provided at the head and foot of each inclined ladder as specified in Section 6 of the Technical Specification.

5.8.5 Vertical Ladders and Rungs

Steel vertical ladders of rugged construction shall be provided for access to all tanks and void spaces below the Lower Vehicle Deck, to the Steering Gear compartments, escape trunks, funnel, uptakes, Emergency Generator Room exhaust stack uptake, housetops, masts, and any other locations where necessary for proper access.

Vertical ladders are to be recessed under decks no more than necessary to clear the opening. Handgrabs in accordance with ASTM F783 shall be provided at the head of ladders as necessary.

Vertical ladders shall be constructed of 2½ inch × ⅜ inch flat bar stringers with ¾ inch square rungs welded to the stringers, in accordance with ASTM F840.

Where practicable, ladders may be of separate rungs of ¾ inch square bar welded to the structure in general accordance with ASTM F783. Where not extending from side to side of adjacent structure, these rungs shall be stirrup shaped to prevent slipping sideways. All vertical ladders shall be bolted in place except for individual rungs welded to the structure. All vertical ladders and individual rungs shall have at least a fourteen (14) inch wide effective rung width, a foothold depth of six (6) inches and spaced twelve (12) inches center to center.

Grab rails are to be provided up the main masts and in way of all access manholes, as necessary.

5.8.6 Jacobs Ladders

Jacobs Ladders are specified in Section 16 of the Technical Specifications.

5.9 HANDGRABS

Handgrabs shall be provided on both sides of hatches, manholes, and lightening holes through vertical plane bulkhead, structure, or similar tank accesses, etc. to assist in Vessel personnel passage through these openings where ongoing ingress/egress will be required for service and inspection. Handgrabs shall be of ASTM F783, Table 2, Type II round bar

handgrabs configuration. Handgrabs shall be installed just above the opening within reach of personnel passing through the opening. For bidding purposes, Proposers shall figure providing and installing one-hundred (100) handgrabs. Final locations shall be as designated by the Vessel staff.

5.10 HANDRAILS, LIFELINES AND LADDERWAY CHAIN GUARDS

5.10.1 General

Design and provide rails located as determined by the Contractor's Design, and as required to comply with USCG requirements of 46 CFR §72.40 and the applicable ADA requirements.

All railings shall be free of clothes entangling projections and shall be welded and galvanized. They shall be fabricated in sections and hot-dip galvanized. All field welds shall be thoroughly cleaned and given a 0.010 inch thick spray coat of zinc. All welds shall be ground smooth, cleaned and coated as above. Rails shall be bent to radiused corners and storm rails shall return against the bulkhead. Rails and flatbars are to be painted in accordance with Section 14 of the Technical Specification. Galvanized steel handrails shall be provided around all exterior decks and landings as required by regulations.

All rails shall be adequately supported and braced for structural integrity and to prevent vibration. The top course of rails shall be forty-two (42) inches above finished decks, steps or curbs and have a hand clearance of not less than 2½ inches from the adjacent structure or bulkhead.

The lower course of all railings and guards utilizing weld mesh panels in areas accessible to Passengers shall be no higher than three (3) inches from the deck to the lower course underside.

Rails and guards in machinery spaces are specified in Section 79 of the Technical Specification.

Interior decorative rails are required in Passenger spaces and Passenger stairways as determined by the Contractor's design and Section 25 of the Technical Specification. Provide tactile strips on the underside end of the rails to aid the visually impaired.

See the *LADDERS* Subsection in this Section of the Technical Specification for inclined ladder rails.

Interior stairways shall have pipe rails, secured to stanchions or structure. The rails shall have a hand clearance of not less than 2½ inches and be forty-two (42) inches above the deck or step.

5.10.2 Passenger Railings

Railings around the periphery of the Sun Deck, and at the embarkation (Picklefork) areas at each end of the Passenger Deck shall have a 2½ inch IPS, Schedule 40 flattened top rail, 1¼ inch IPS Schedule 40 steel pipe stanchions spaced a maximum of fifty-four (54) inches with 1 inch IPS, Schedule 40 steel lower rails fitted with weld mesh panels. Stanchion pipe stays shall be provided at least at every other stanchion. The Stanchion pipe stays shall be located outboard of the stanchions to preclude the trip hazard presented if installed on the inboard side of the stanchions. All stanchion and pipe stay connection to deck plating shall include a minimum 2½ inch, 10.2# plate doubler plate welded continuously. Panels shall be framed on three (3) sides in a 16 ga. stainless steel "U" channel (welded seams) with 1" square mesh × 0.177", Type 304 stainless steel weld mesh suitably framed and stiffened with Schedule 40, galvanized pipe with 1" × $^{3}/_{16}$" Type 316L stainless steel clips. The bottom support shall be a ⅛" × 1½" stainless steel flat bar tack welded to the weld mesh and side "U" channel. Rails, stanchions, pipe stays, and clips shall be galvanized. The railing system shall generally be as installed on *Jumbo Mark II* Class Vessels, except that the pipe stays shall be mounted **outboard** of the railings generally as installed on the WSF Ferry *M/V SPOKANE*, and in accordance with the requirements of this Subsection.

Stanchions and pipe stays shall be aligned with stiffeners in the deck.

Provide a weld mesh panel to rail clip fastener system (each bolt fastener consisting of one (1) bolt, two (2) flat washers, and one (1) lock nut shall be Type 316 stainless steel with Nyloc type nuts). Maintain a 2½ inch clearance between the underside of the top rail and the upper side of the lower rail bordering the upper and lower edges of the screen panels. Maintain a ½ inch clearance between the screen panel and adjacent rails and stanchions. See the *WELD MESH ENCLOSURES* Subsection in Section 3 of the Technical Specification for additional requirements for weld mesh enclosures.

5.10.3 Passenger Embarkation Gates

Provide horizontal rolling embarkation gates, generally as installed on *Jumbo Mark II* Class Vessels, constructed of aluminum tubing and clips, and stainless steel weld mesh panels, sized to match the galvanized periphery railings at each end of the Passenger Deck. A positive locking device shall be provided on the railing to prevent the gate from sliding while underway. Two (2) gates, one port and one starboard, are required for each End of the Vessel. See the *WELD MESH ENCLOSURES* Subsection in Section 3 of the Technical

Specification. For general sliding (rolling) gate location/orientation, see Section 1B of the Technical Specification.

5.10.4 Passenger Deck Maintenance Railings

Handrails of the storm rail type shall be fitted just below the windows on the Passenger Deck Port and Starboard maintenance walkway, and extending to the ends of the house sides. All stanchion and pipe stay connection to bulkhead plating shall include a minimum 2½ inch, 10.2# plate doubler plate welded continuously.

A DBI/SALA cable safety line system and equipment, as set forth in the *SAFETY LINES AND FITTINGS* Subsection in this Section of the Technical Specification shall be provided.

5.10.5 Upper Vehicle Deck Railings

Railings on the Upper to Lower Vehicle Deck ramps shall be five (5) course. The top rail and stanchions shall be 1¼ inch IPS, Schedule 40 pipe, the lower rails shall be ¾ inch IPS, Schedule 40 pipe, all galvanized steel. Provide a 3" × ¼" high flat bar coaming along the inboard edge of all ramp curbing to prevent items set on the curbing such as wheel chocks from falling onto Passengers or vehicles on the Lower Vehicle Deck below. All stanchion and pipe stay connection to deck and/or bulkhead plating shall include a minimum 2½ inch, 10.2# plate doubler plate welded continuously.

5.10.6 Navigation Bridge Deck Railings

Railings on the Navigation Bridge Deck (to include the removable catwalks) shall be four (4) course. The top rail and stanchions shall be 1¼ inch IPS Schedule 40 pipe, the lower rails shall be ¾ inch IPS, Schedule 40 pipe, all galvanized steel. Provide a gate for access to the Pilothouse service platforms in accordance with Section 79 of the Technical Specification. All stanchion and pipe stay connection to deck and bulkhead plating shall include a minimum 2½ inch, 10.2# plate doubler plate welded continuously.

5.10.7 Mast and Raised Platform Rails

Provide rails around all mast mounted and other raised platforms. The rails shall be two (2) course. The top rail and stanchions shall be 1¼ inch IPS, Schedule 40 pipe, the lower rails shall be ¾ inch IPS, Schedule 40 pipe, all galvanized steel.

5.10.8 Handrails

Handrails of the storm rail type shall be fitted just below the window openings on the outboard sides of the Lower Vehicle Deck curtain plating, and extending to the ends of the bulwarks. All stanchion and pipe stay connection to bulkhead plating shall include a minimum 2½ inch, 10.2# plate doubler plate welded continuously.

Handrails of the storm rail type shall be fitted above the front exterior face of each Pilothouse just below the window openings and extending the entire front face of each Pilothouse. See the *SAFETY LINES AND FITTINGS* Subsection in this Section the Technical Specification for Pilothouse safety line system requirements.

5.10.9 Chain Rails

Single course chain rails of $^{3}/_{16}$ inch galvanized chain, complete with stainless steel snap hook at each end of the chain, and adequate securing staples, shall be installed at the head of each ladder leading to Bridge Wings and housetops, across the bottom of each Passenger Deck to Sun Deck stairwell, across each entrance from the house to Passenger boarding areas, and across each boarding area at the midship end of the aftermost gangway gate, port and starboard on each End. At boarding areas welded eyes or staples shall be provided on the rails so that when chains are not in place, they may be stretched along the rail and secured without laying on the deck.

"**CREW ONLY**" or "**AREA CLOSED – NO ADMITTANCE**", as appropriate, type notices shall be attached to the chain in accordance with Section 24 of the Technical Specification.

5.10.10 Storm Rails

Storm rails shall be provided as required by USCG and 46 CFR §72.40. Storm rails shall be of one (l) inch IPS, Schedule 40 galvanized steel pipe normally set at thirty-six (36) inch height above the deck. All stanchion and pipe stay connection to deck and bulkhead plating shall include a minimum 2½ inch, 10.2# plate doubler plate welded continuously.

5.10.11 Curtain Plate Openings Safety Rails

Single safety rails shall be provided for the Upper and Lower Vehicle Deck curtain plate openings. Safety rails shall be of one (l) inch IPS, Schedule 40 galvanized steel pipe.

5.11 MOORING FITTINGS

Mooring fittings shall be designed and provided as by the Contractor's design. Provide minimum 36-inch cleats near the Vessel Ends port and starboard (four (4) total) for use in securing the Vessel while loading and unloading vehicles and Passengers. These cleats shall be capable of being used to tow the Vessel in the event of an emergency. Along the Vessel sides port and starboard, provide four (4) minimum 42-inch cleats at the Vessel quarter points, and at least four (4) more (two (2) each side) minimum 36-inch cleats equally spaced.

Mooring cleats shall be minimum 36-inch WILLIAM DRURY Co., or equal, type cast steel, suitable for deck welding.

Mooring pipes (chocks) shall be 8 inch × 12 inch and may be of cast steel or fabricated. Mooring Pipes shall be a minimum of Schedule 160 or better pipe equivalent material.

All insert plates and additional stiffening to local structure shall be provided as necessary for the intended service.

Mooring pipes and cleats shall have all rough edges ground smooth to prevent damage to mooring line.

5.12 CLEATS AND STOPPERS

Cleats and/or stoppers shall be provided as required for securing halyards, safety restraint systems on the mast and funnel and for other general use.

In addition to the above, provide the following items in general areas as noted. Final installation location shall be determined by the WSF Representative.

Provide a total of twenty-two (22) 10-inch cleats.

Install fourteen (14) 10-inch cleats as follows:

1. Masts - three (3) each End
2. Rescue Boat Stations - two (2) each End
3. Sun Deck Passenger Lounge Top - two (2) each End
4. The remaining eight (8) cleats shall be delivered to WSF as Spares.

5.13 MISCELLANEOUS FITTINGS

Provide the following items in general areas as noted. Final installation location shall be determined by the WSF Representative.

Install three (3) $1^{1}/_{2}$ inch diameter Pike Pole (16 feet long) brackets as follows:

1. No. 1 and 2 End Curtain Plate at approximately Model Design Frame 65 - one (1) each
2. No. 2 End Curtain Plate, port side at approximately Model Design Frame 35 - one (1) each

Install four (4) 1 inch diameter Boat Hook (8 feet long) brackets as follows:

1. Each Rescue Boat Station - one (1) each
2. No. 1 End Curtain Plate, starboard at approximately Model Design Frame 39 - one (1) each
3. No. 2 End Curtain Plate, portside at approximately Model Design Frame 45 - one (1) each

5.14 LIFTING PADEYES

Padeyes shall be provided as required for access to, maintenance of, and handling of propellers and rudders, handling of gangways, over installed machinery and for handling heavy equipment in way of storeroom access hatches, and elsewhere as necessary for securing equipment or temporary lighting.

Unless otherwise noted, padeyes shall be steel and of strength suitable to the purpose intended.

Provide at a minimum, twenty (20) each 1½ inch safety line padeyes at the following locations and as directed by the WSF Representative:

1. Bow and Stern - two (2) each
2. Pickleforks - two (2) each
3. Exterior ladders to Sun Deck area house tops - two (2) each

Provide four (4) 500# rated Jacobs Ladder deployment padeyes (see Section 16 of the Technical Specification) at the following locations:

1. Rescue Boat Stations No. 1 and 2 - two (2) each. Padeyes shall be installed on the inboard side of the Curtain Plating, just above the top of the plating opening. Padeyes shall be designed to accommodate the carabineers required by the *JACOBS LADDER* Subsection in Section 5 of the Technical Specification.

A minimum of eight (8) recessed padeyes, similar to PACIFIC MARINE & INDUSTRIAL Drawing #3490-A tie-downs, shall be provided above the waterline to provide a permanent means for ready rigging and positioning (shipping) of rudders and propellers. Capacity, location, and number of the recessed padeyes shall be determined by the Contractor's design and approved by the WSF Representative.

The rudder guard (log splitter) at each End of the Vessel shall have a 3½ inch diameter hole thru the plate near the lower end to allow the installation of a shackle to be used in conjunction with the eight (8) recessed padeyes above. This padeye structure shall be designed and tested the same as all other padeyes. Testing shall be 1½ times its maximum rated load (11,000#), as limited by the log splitter plate and structure. Provide a written report of the test to the WSF Representative. Provide permanently installed Type 316L stainless steel metal labels 100% welded to the hull, in accordance with Section 50 of the Technical Specification.

Lifting gear shall be as specified in this Section and Sections 2, 50, 53, and 80 of the Technical Specification.

5.15 CURBING AND FREEING PORTS

Raised curbs and walkways of flanged diamond plate shall be fitted along the inside of the Curtain Plating and on each side of Machinery Casings on the Lower Vehicle Deck, and along each side of the Vehicle ramps, curtain plating and casings on the Upper Vehicle Deck.

NOTE: There shall be openings in the curbing at the access doors to both Rescue Boat Stations and the Anchor Winch Area.

Portable plates shall be provided in walkways in way of deck drains, freeing ports, and scuppers to facilitate cleaning and painting. They shall be flush mounted and secured with counter-sunk, slotted flathead stainless steel machine screws.

Provide nine (9) freeing ports on each side of the Vessel. These freeing ports shall be located in the curtain plate at the Lower Vehicle Deck level, Port and Starboard. There shall be no "sill" in the freeing port. One (1) freeing port shall be located in each bulwark, near the bottom of the UVD ramp. The others shall be distributed with one (1) roughly at midship and the others approximately evenly between the ramps but favoring the Vessel Ends. Each freeing port shall be 24" wide × 5" high where it exits through the curtain plate, and opened up to 36" wide at the inboard edge of the curbing. One (1) horizontal, Type 316 stainless steel round bar shall be

mounted on the midpoint of the vertical opening plane to prevent a ball of over 4" diameter from passing through the freeing port. The curbing in way of the freeing port shall be interrupted, and the interruption covered with a diamond pattern horizontal plate, full width, with a 1" flange on the inboard side, supported by transversely oriented flat bars spaced 12" apart. The horizontal plate shall be removable, and held in place with ⅜" countersunk Type 316 stainless steel socket flat head cap screws, with clearance holes through flat bars welded on top of the transverse flat bars, and others welded to the curb, where interrupted. WSF Drawings No. A75-630-01, VEHICLE CURBING (*latest revision*), amplifies a methodology of a WSF JUMBO MK II Class Vessel acceptable to WSF.

Curb and walkway boundaries shall be welded watertight all around. Two (2) ½ inch IPS test fittings with bronze countersunk plugs shall be provided for each section. Test fittings are to be flush mounted.

Curbs shall be treated as specified in Section 14 of the Technical Specification, after being air tested in accordance with Section 101 of the Technical Specification.

5.16 VEHICLE GUARD STANCHIONS

Design and provide four (4) inch IPS galvanized Schedule 80, pipe stanchions, similar to those specified for Vehicle Deck MES installations on other WSF Vessels, outside the Deck Crew Shelter, LVD Emergency Squad Locker, elevator house structure facing the Ends of the Vessel, and all other areas on the Vehicle Decks, to suit the Contractor's design, where vehicle impact could damage equipment or personnel, as determined by the WSF Representative, during the Phase II Technical Proposal stage of the Work. Guards shall be coated same as a MES guard ("SIGNAL YELLOW" with diagonal "BLACK" stripes, see Sections 14 and 24 of the Technical Specification). WSF Drawing No. 8300W-505-16-3 (*latest revision*) represents vehicle guard stanchion methodology acceptable to WSF.

5.17 VEHICLE BARRIER

For WSF Fleet-wide Standardization purposes provide a nylon web type vehicle barrier at each End of the Vessel, the same as used fleet-wide on the WSF Vessels. Netting can be purchased from NET SYSTEMS, INC., 7910 Day Road West, Bainbridge Island, WA 98110, (206) 842-5623 or toll free, (800) 722-5568. The barrier shall consist of two (2) each, 2½ inch diameter × 38 inch long, 6061 Schedule 40 aluminum pipe support stanchions (with socket stop rings at bottoms), with three (3) each 3 inch × ⅜ inch diameter stainless steel "I" bolts; two (2) each 3 inch diameter × 6 inch deep deck sockets (in Vehicle Deck); nine (9) each extra heavy duty stainless steel single locking safety hooks; three (3) each ⅜ inch diameter × 3 inch diameter stainless steel rings; and six (6) each padeyes (three (3) on the end of each bulwark). The vehicle barrier webbing shall be in two (2) pieces, each 30 inches high with safety hooks and

ring connectors at the center line of the deck to secure the two ends. The outboard ends are to be secured to padeyes at the bulwark using the safety hooks. Connect the stanchion "I" bolts to the webbing with ⅜ inch diameter stainless steel shackles. Webbing shall be 1-inch wide, rated for 9,600# tensile strength, and impregnated to resist oil, low temperatures and abrasion. Thread shall be 6-cord bonded nylon and conform to Military Specification VT 295. Stitching shall comply with Federal Specification Standard 751. All connecting hardware shall be sufficiently rated and approved by the USCG. Barriers are to be located on the Lower Vehicle Deck across the ends of the Lower Vehicle Deck bulwarks. Provide as spares, two (2) additional net pieces with attached hooks and connectors and (2) additional stanchions.

See Section 24 of the Technical Specification for Vehicle Barrier safety marking lines.

5.18 SAFETY LINES AND FITTINGS

For Fleet-wide Standardization purposes, all safety lines shall be a stainless steel flexible cable systems from DBI/SALA, complete with all hardware and fittings including: cable systems, shuttles, safety sleeves, connecting hooks ("carabineers"), self retracting lifelines (SRL), and vest-style harnesses as set forth in **TABLE 5-1** below. See *NAVIGATION BRIDGE DECK MAINTENANCE PLATFORM* and the *SUN DECK MAINTENANCE PLATFORMS* Subsections in Section 3 of the Technical Specification for additional information.

Provide DBI/SALA, LAD-SAF®, *Flexible Cable System* safety lines and fittings from the base to the top of each vertical ladder access to the top of each mast structure for access/maintenance purposes.

Provide DBI/SALA, evolution™, *Horizontal Lifeline System* safety lines and fittings along the walkway from the top of the Pilothouse top access ladder to the mast for access and maintenance purposes.

Provide DBI/SALA, evolution™, *Horizontal Lifeline System* safety lines and fittings to serve the entire access to and along the Navigational Bridge Deck maintenance platforms for access, maintenance and window washing purposes. The *Horizontal Lifeline System* safety system shall be attached to the underside of each Pilothouse forward visor, above the Pilothouse window level, and above the entire Navigation Bridge Deck Maintenance Platform run. Installation of the lifeline system shall not block any view out of the Pilothouse windows, nor interfere with the windshield wiper system operation and/or maintenance.

Provide DBI/SALA, evolution™, *Horizontal Lifeline System* safety lines and fittings to serve the entire access to and along the Sun Deck Passenger Lounges maintenance platforms for access, maintenance and window washing purposes. The *Horizontal Lifeline System* safety system shall be attached to the forward face of each lounge just above the window level, and above the entire Sun Deck Maintenance Platform run.

Provide DBI/SALA, evolution™, *Horizontal Lifeline System* safety lines and fittings to serve the entire access to and along the Passenger Deck Port and Starboard maintenance walkway for access, maintenance, and window washing purposes. The *Horizontal Lifeline System* shall be attached just above the window level, and above the entire Port and Starboard maintenance walkway run.

All cable systems shall be provided so that a 5'-4" tall Crew member can readily attach into the cable system, from either end of the system without any assistance, ***prior*** to entering the hazard area.

All cable system equipment and standoff attachments shall be provided with Type 316L stainless steel weld studs and fasteners. The cable system components **shall not** be painted.

TABLE 5-1
DBI/SALA Systems Accessories and Hardware

System	Accessory/Hardware	Size	Qty. ea. Vessel
LAD-SAF®	LAD-SAF® sleeve with Saflok® carabineer #6116502	n/a	2
evolution™	Shuttle	n/a	4
LAD-SAF®/ evolution™	Ultra-Lok® Self Retracting Lifeline (SRL), #3504434	20 foot stainless steel	4
LAD-SAF®/ evolution™	Vest-Style Harness, #1108601	Med.	2
LAD-SAF®/ evolution™	Vest-Style Harness, #1108602	Lg.	2
LAD-SAF®/ evolution™	Vest-Style Harness, #1108606	X-Lg.	2

All DBI/SALA safety line systems, under the direction of the Contractor, shall be engineered, installed, tested, and factory certified by factory, or factory trained and certified DBI/SALA representatives, and a set forth in the *TESTS, TRIALS, AND INSPECTIONS* Subsection in this Section of the Technical Specification.

See the *TRAINING OF WSF PERSONNEL* Subsection in Section 1 of the Technical Specification.

Provide a suitable staple, as set forth in ASTM F783, Table 1, Type II, near the middle of the weather side of the stack diaphragm plating sized to accept and support the attachment of and load rating of a DBI/SALA Ultra-Lok® SRL, #3504434. The staple shall be welded to a 6"×6 " 10.2# plate doubler plate welded continuously to the diaphragm plate.

5.19 SPARE PARTS AND INSTRUCTION MANUALS

Provide a list of recommended spare parts and special tools, for those items which are Contractor furnished, together with parts lists and instruction manuals necessary to maintain and service provided equipment and accessories in accordance with the requirements of Sections 86 and 100 of the Technical Specification.

5.20 TESTS, TRIALS, AND INSPECTIONS

Tests and/or trials shall be in accordance with Section 101 of the Technical Specification.

Inspections shall be performed as defined in this Section and in Sections 1 and 2 of the Technical Specification.

5.21 PHASE II TECHNICAL PROPOSAL REQUIREMENTS

The following deliverables, in addition to other deliverables required by Section 100 of the Technical Specification and the Authoritative Agencies, shall be provided during the Phase II Technical Proposal stage of Work in accordance with the requirements of Section 100 of the Technical Specification:

A. Windows Summary List and Details

B. Preliminary Mooring Arrangement and Details Study

Windows Summary List & Details shall be provided. This summary list shall specify the window type, location, opening type (if applicable), layout, dimensions, material type, fire rating, water rating, clear opening, remarks, and other information pertinent to conceptually definition of all windows and portlights, exclusive of those installed in doors.

The ***Preliminary Mooring Arrangements and Details*** shall depict all mooring stations' fittings and the intended layout of all lines through the various fittings to the dock fittings for each port listed in Section 1 of the Technical Specification. The relative location and orientation of the Vessel with respect to the docks as shown on these diagrams shall correspond to the relative

location and orientation of the Vessel to the docks as shown on the dock interface drawings required by Section 1B of the Technical Specification.

See Section 100 of the Technical Specification for additional requirements regarding technical documentation.

5.22 PHASE III DETAIL DESIGN AND CONSTRUCTION REQUIREMENTS

The following deliverable, in addition to other deliverables required by Section 100 of the Technical Specification and the Authoritative Agencies, shall be provided during the Phase III Detail Design stage of Work in accordance with the requirements of Section 100 of the Technical Specification:

A. Mooring Arrangement Diagrams

The ***Window Schedule & Details*** drawing requirements in Section 100 of the Technical Specification shall include the layout, dimensions, and window and frame details of all windows and portlights, exclusive of those installed in doors. Evidence of successful prior application of all proposed exterior window details shall be provided along with references. The proposed details should have a record of at least ten (10) years of prior successful application in a marine environment.

See Section 100 of the Technical Specification for additional requirements regarding technical documentation.

(END OF SECTION)